

CLAIMS:

1. An energy absorbing type steering device, in which an outer cylindrical member is press-fitted around an inner shaft member, the steering device being characterized in that:

the outer shape of inner shaft member has a circular cross section;

the inner shape of outer cylindrical member has a circular cross section and has a diameter that is larger than the diameter of the outer shape of the inner shaft member; and

a plurality of fine members is disposed between the circular cross-sectional outer shape and the circular cross-sectional inner shape, the fine members extending along the axial direction of the inner shaft member and the outer cylinder member.

2. An energy absorbing type steering device according to claim 1, characterized in that the Vickers hardness of the inner shaft member and the Vickers hardness of the fine members differs by at least 200 or the Vickers hardness of outer cylindrical member and the Vickers hardness of the fine members differs by at least 200.

3. An energy absorbing type steering device according to any one of claims 1 and 2, characterized in that the circumferential arrangement of the plurality of fine members has been adjusted in accordance with the pressing load that is required to press-fit the outer cylindrical member around the inner shaft member.

4. An energy absorbing type steering device according to any one of claims 1 to 3, characterized in that the inner shaft member and the outer cylindrical member are fitted together with a clearance between the members, the clearance being defined at least along the length of the fine members in the axial direction.
5. An energy absorbing type steering device according to any one of claims 1 through 4, characterized in that the length of the fine members in the axial direction is longer than or equal to a predetermined length that ensures a clearance between the inner shaft member and the outer cylindrical member when the inner shaft member and the outer cylindrical member absorb energy and become more deeply fitted.
6. An energy absorbing type steering device according to any one of claims 1 through 5, characterized in that movement of the fine members in the axial direction is prohibited by fixedly coupling the fine members to an end face of the inner shaft member or to an end face of the outer cylindrical member.
7. An energy absorbing type steering device according to claim 6, characterized in that a pull-in prevention means is disposed on the end face of a coupling portion of each of the fine members.
8. A method for assembling an energy absorbing type steering device by press-fitting an outer cylindrical

member around an inner shaft member, the method being characterized by:

a step of extending a plurality of fine members along the axial direction of an outer shape of the inner shaft member or an inner shape of the outer cylindrical member; and

a step of pressing-fitting the outer cylindrical member around the inner shaft member while providing a clearance between the inner shaft member and the outer cylindrical member by means of the fine members, the clearance being defined at least along the length of the fine members that are interleaved between the members.

9. A method according to claim 8, characterized in that at least one of the inner shaft member, the outer cylindrical member, or the fine members is deformed beyond an elastic limit thereof during the pressing step.

10. A method according to any one of claims 8 and 9, further characterized by a step of measuring the pressing load being applied during the pressing step, and a step of cutting the fine members when the measured pressing load reaches a predetermined value.

11. A method according to any one of claims 8 to 10, further characterized by a step of extending a predetermined length of the plurality of fine members along the axial direction of the inner shape of the outer cylindrical member, and a step of pressing the inner shaft member while prohibiting the fine members from being axially pulled further into the outer cylindrical member.

12. An apparatus for assembling an energy absorbing type steering device being characterized by:

a device for press-fitting an outer cylindrical member around an inner shaft member; and

a fine member supply device, disposed adjacent to the pressing device, for supplying a plurality of fine members into a clearance defined between an outer shape of the inner shaft member and an inner shape of the outer cylindrical member.

13. A device according to claim 1, characterized in that the inner shaft member is an inner tube or an inner shaft, and the outer cylindrical member is an outer tube or an outer shaft.

14. A method according to claim 8, characterized in that the inner shaft member is an inner tube or an inner shaft, and the outer cylindrical member is an outer tube or an outer shaft.

15. An apparatus according to claim 12, characterized in that the inner shaft member is an inner tube or an inner shaft, and the outer cylindrical member is an outer tube or an outer shaft.

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